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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
ROYSTON, ELIZABETH	

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/522,723	JACQUES ET AL.	
	Examiner	Art Unit	
	Elizabeth Royston	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-13 and 19-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-13 and 19-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's amendment to claims 1, 5, 7-9, the addition of claims 19-31, and the cancellation of claims 4 and 16 on 9/15/2009 have been noted and accepted.

2. Claims 1-3, 5-13, and 19-31 are examined in the instant Official action.

Claim Objections

3. Claim 27 is objected to because of the following informalities: The designation "Previously Presented" is incorrect and should be changed to "New". Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1, 2, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer (US PN 3170781) in view of Froberg (US PN 4358304), and Sorg (US PN 5630860).

With regard to clams 1, 2, 19, and 20, Keefer teaches a process for the continuous preparation of a composition comprising silica in a furnace comprising at least two tanks in series (figure 1, item 11 and 13), said process comprising introducing most of the granular silica (col. 3, line 42, cullet) into a first tank comprising at least one submerged burner (figure 1, item 19), melting most of the silica in the first tank (col. 2, line 17-20), and transferring the silica (figure 1, item 12) to a second tank comprising at least one submerged burner (figure 1, item 21).

Keefer does not explicitly disclose the addition of a fluxing agent to the first tank.

Froberg teaches that it was known in the art at the time of the invention to include a soda ($NaCO_3$) fluxing agent, the same fluxing agent as disclosed by Applicant (Specification, page 6, line 29), with the initial molten stage of the melt (col. 1, line 17-24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the soda fluxing agent in the teaching of Froberg in the initial melt of the first tank in the teaching of Keefer. The rationale to do so would have been the motivation provided by the teaching of Froberg, that to add a soda fluxing agent to the initial melt predictably results in the formation of an initial molten stage that hastens the dissolving of the silica and/or silicates (col. 1, line 19-21).

Furthermore, since Keefer teaches 100% of the silica added to the first tank for melting (col. 2, line 24-27), it would have been obvious to one of ordinary skill in the art at the time of the invention that in order to obtain an initial molten state where the enhanced dissolution of the silica and/or silicates is to be achieved, that the material to be dissolved (silica) and the equivalent amount of the material required to hasten the dissolution (soda fluxing agent) would have intrinsically been included in the first tank containing the initial melt.

Keefer in view of Froberg further does not explicitly disclose heating the first tank to a higher temperature than the other tank of the furnace.

Sorg teaches that it was known in the art at the time of the invention to operate refining zones at lower temperatures than the melting furnace (col. 3, line 20-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Sorg in the teaching of Keefer in view of Froberg and operate the temperature of the second tank at a lower temperature than the first tank. The rationale to do so would have been the motivation provided by the teaching of Sorg, that to use such a temperature change predictably results in the increased homogenization and improved quality of the glass (col. 3, line 24-25).

7. Claims 3, 21, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer (US PN 3170781) in view of Froberg (US PN 4358304) and Sorg (US PN 5630860), as applied for claims 1, 2, 19, and 20 above, and in further view of Kunkle (US PN 4632687).

With regard to claims 3 and 21, although Keefer in view of Froberg and Sorg does teach the addition of the thinner (Froberg, col. 3, line 11, B_2O_3) claimed by Applicant (Specification, page 6, line 31), Keefer in view of Froberg and Sorg does not explicitly disclose the addition of at least 90% of a thinner into the second tank.

Kunkle teaches that it was known in the art at the time of the invention to add compositional modifiers during the refining stage (Kunkle, col. 9, line 23-26),.

Since the refining stage in the teaching of Kunkle correlates with the second tank refining stage in the teaching of Keefer in view of Froberg and Sorg (Keefer, col. 2, line 21-22), it would have been obvious to one of ordinary skill in the art at the time of the invention to add any compositional modifiers to the second tank in the teaching of Keefer in view of Froberg and Sorg.

Furthermore, Froberg teaches that materials such as borates are used to provide the final glass product with sufficiently low solubility in water (col. 1, line 31-32), and thus improved weathering properties, in order to offset the high solubility of the glass when soda alone is used (col. 1, line 23-26). Since the borate in the teaching of Froberg acts as a compositional modifier, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the borate material during the refining stage of the second tank in the teaching of Keefer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Kunkle in the method of melting glass in the teaching of Keefer in view of Froberg. The rationale to do so would have been the motivation provided by the teaching of Kunkle, that to add a compositional modifier to the refining

stage predictably results in the formation of glass melts with well mixed compositions that maintain a great flexibility for making a wide variety of products (col. 9, line 23-27).

With regard to claim 31, Keefer in view of Froberg and Sorg teaches two tanks in series, each tank comprises at least one submerged burner (figure 1, item 11, 13, 19, 21), the first tank being a melt furnace (col. 2, line 17-20) and the second tank being a refining tank (col. 2, line 36).

Keefer in view of Froberg and Sorg do not explicitly teach 3 tanks in series and each tank comprising at least one submerged burner.

Kunkle teaches that a refining zone (col. 4, line 24-26; figure 1, item 11) with two tanks in series (figure 1, item 50, 52) each comprising at least one submerged burner (figure 1, item 57 and 58) was known in the art at the time of the invention.

Since a melting tank in series with a refining zone was known from the teaching of Keefer, and since a refining zone with two tanks in series was known from the teaching of Kunkle, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the refining zone in the teaching of Kunkle with the melting tank in the teaching of Keefer and create three tanks in series comprising a melting tank and two refining tanks, each with a submerged burner. The rationale to do so would have been the motivation provided by the teaching of Kunkle, that to have a refining zone with two burners predictably results in the successful homogeneous re-oxidation of the glass product within an adequate residence time (Kunkle, col. 10, line 15-23).

8. Claims 5, 6, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer (US PN 3170781) in view of Froberg (US PN 4358304) and Sorg (US PN 5630860), as applied for claims 1, 2, 19, and 20 above, and in further view of Ritze (US PN 4106946).

With regard to claims 5, 6, 22, and 23, although Keefer in view of Froberg teaches a melting temperature of 1315°C, Keefer in view of Froberg does not explicitly disclose the temperature difference between the first tank and the other tanks as at least 80°C or the second tank operating at a temperature of at most 1150°C.

Sorg teaches that it was known in the art at the time of the invention to operate refining zones at lower temperatures than the melting furnace (col. 3, line 20-25), and furthermore teaches that temperature reductions of 1350°C to 1120°C in glass melts were known (col. 5, line 13-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Sorg in the teaching of Keefer in view of Froberg and operate the temperature of the second tank at a lower temperature than the first tank. The rationale to do so would have been the motivation provided by the teaching of Sorg, that to use such a temperature change predictably results in the increased homogenization and improved quality of the glass (col. 3, line 24-25).

Furthermore, since Ritze teaches that it was known in the art at the time of the invention that the operating temperatures of the melt process is a result effective variable dependent on the glass composition (col. 2, line 64-65), it would have been

obvious to one of ordinary skill in the art at the time of the invention to operate the first and second tanks at temperatures that optimized the quality of the particular glass melt.

In the alternative with regard to claims 5 and 22, Keefer in view of Froberg and Sorg does not explicitly disclose a temperature difference between the first and second tanks.

Ritze teaches operating the first tank at least 80°C higher than the other tank (col. 2-3, line 64, 3-7; temperature drop from 1320° to 1230°C).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the temperature differences in the teaching of Ritze as the temperature differences in the teaching of Keefer in view of Froberg. The rationale to do so would have been the motivation provided by the teaching of Ritze, that to use such a temperature difference predictably results in the formation thoroughly homogenized high optical quality glass (col. 3, line 7-10).

5. Claims 7- 9, 13, 24-26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer (US PN 3170781) in view of Froberg (US PN 4358304) and Sorg (US PN 5630860), as applied for claims 1, 2, 19, and 20 above, and in further view of Coffeen (US PN 2492523).

With regard to claims 7-9 and 24-26, Keefer in view of Froberg and Sorg does not explicitly disclose a frit with a composition of 40-70 wt% SiO_2 or 5-15 wt% B_2O_3, or the addition of 2-20wt% of metal oxide.

Coffeen teaches a frit (col. 1, line 44) composition with 30-50wt% SiO_2 and 3-12 wt% B_2O_3 (col. 2, line 1-10), and the addition of 2-10wt% of a metal oxide (col. 2, line 5 – titanium dioxide) from the list including chromium, cobalt, copper, nickel, selenium, zirconium, titanium, manganese, praseodymium, iron, or zinc.

It would have been obvious to one of ordinary skill at the time of the invention to use the composition in the teaching of Coffeen in the method in the teaching of Keefer in view of Froberg and Sorg. The rationale to do so would have been the motivation provided by the teaching of Coffeen, that to use the composition taught by Coffeen predictably results in the increased acid-resistance and workability of the frit (col. 1, line 1-8).

With regard to claims 13 and 30, Keefer in view of Froberg and Sorg does not explicitly disclose a color frit, a tile frit, or enamel.

Coffeen teaches enamel (title).

It would have been obvious to one of ordinary skill in the art at the time of the invention to create enamel as in the teaching of Coffeen using the method of Keefer in view of Froberg and Sorg. The rational to do so would have been the motivation provided by the teaching of Coffeen, that to create such enamel predictably results in the formation of acid resistant surfaces (col. 1, line 1-5; col. 4, line 1-2).

6. Claims 10-12 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer (US PN 3170781) in view of Froberg (US PN 4358304), Sorg

(US PN 5630860), and Kunkle (US PN 4632687), as applied for claims 1-3, 19-21 above, and in further view of Ritze (US PN 4106946).

With regard to claims 10 and 27, Keefer in view of Froberg, Sorg, and Kunkle teaches that a colorant is added during the refining stage, or the second tank (Kunkle, col. 9, line 23-25; figure 1, item 11 – first tank), although Keefer in view of Froberg, Sorg, and Kunkle does not specifically disclose the addition of a metal oxide to the second tank.

Ritze teaches a metal oxide colorant in glass (col. 2, line 25).

It would have been obvious to one of ordinary skill at the time of the invention to add the metal oxide as taught by Ritze as a colorant to the second tank during the refining stage as taught by Keefer in view of Froberg, Sorg, and Kunkle. The rationale to do so would have been the motivation provided by the teaching of Ritze, that to use the colorants taught by Ritze predictably produces glass with a good homogeneity of color and a minimum of defects (col. 2, line 47-50).

With regard to claims 11 and 28, Keefer in view of Froberg, Sorg, and Kunkle teaches a first tank at 1315°C (Keefer, col. 3, line 31) and a refining stage comprising a second tank operating at 1290°C (Kunkle, col. 11, line 17), a third operating tank at 1370°C (Kunkle, col. 11, line 19), and a fourth tank for cooling (Kunkle, col. 10, line 48-53; col. 11, line 19-21).

Keefer in view of Froberg, Sorg, and Kunkle does not explicitly disclose a second tank operating at 1000-1150°C and a third tank operating from 900-1000°C.

Sorg teaches that it was known in the art at the time of the invention to operate refining zones at lower temperatures than the melting furnace (col. 3, line 20-25), and furthermore teaches that temperature reductions of 1350°C to 1120°C in glass melts were known (col. 5, line 13-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the method of Sorg in the teaching of Keefer in view of Froberg and Kunkle and operate the temperature of the second and third tanks at a lower temperature than the first tank. The rationale to do so would have been the motivation provided by the teaching of Sorg, that to use such a temperature change predictably results in the increased homogenization and improved quality of the glass (col. 3, line 24-25).

Ritze teaches that the temperature range of homogenization for a glass composition meeting all of applicant's recited limitations (col. 2, line 10-23) is from 950 to 1150°C (col. 3, line 3). Further, Ritze teaches a third tank temperature of 980 to 1080°C (col. 3, line 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the temperatures in the teaching of Ritze in the method in the teaching of Keefer in view of Froberg and Kunkle. The rationale to do so would have been the motivation provided by the teaching of Ritze, that to use such a temperature difference predictably results in the formation thoroughly homogenized high optical quality glass (col. 3, line 7-10).

Furthermore, since Ritze teaches that it was known in the art at the time of the invention that the operating temperatures of the melt process is a result effective variable dependent on the glass composition (col. 2, line 64-65), it would have been obvious to one of ordinary skill in the art at the time of the invention to operate the second and third tanks at temperatures that optimized the quality of the particular glass melt.

With regard to claims12 and 29, Keefer in view of Froberg, Sorg, Kunkle, and Ritze teaches re-oxidation occurs in two sequential tanks (Kunkle, figure 1, chambers 2 and 3), defined as the refining stage (Kunkle, col. 10, line 15-23). While not explicitly teaching that the third tank has a sufficiently oxidizing flame for the oxidation state of the oxide to be raised on going from the second to the third tank, since Kunkle teaches that the re-oxidation occurs by flowing the glass through both of the two sequential tanks, the flame in the third tank must have intrinsically been sufficiently oxidizing for the oxidation state of the oxide to be raised on going from the second to the third tank, as would be required to achieve the successfully re-oxidized product.

Response to Arguments

9. Applicant's arguments with respect to claims 1-3, 5-13, and 19-31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Royston whose telephone number is 571-270-7654. The examiner can normally be reached on M-Th 8:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ER/
Patent Examiner, GAU 1791

/Christina Johnson/
Supervisory Patent Examiner, Art Unit 1791